

What is claimed is:

1 1. A communication network, comprising:

2 (A) local communication links,

3 (B) a plurality of separately located central office switching systems
4 interconnected via trunk circuits for selectively providing switched call
5 connections between at least two of the local communication links in
6 response to predetermined control data messages,

7 (C) a signaling communication system for two-way communications of said
8 control data messages between at least said central office switching
9 systems, said signaling communication system interconnecting the central
10 office switching systems;

11 (D) a signaling gateway, separate from the central office switching systems and
12 connected to said signaling communications system, said signaling
13 gateway including an interface connected to a remote communications
14 network and configured to exchange said control data messages between
15 said remote communication network and said signaling communication
16 system, and

17 (E) a signaling system security monitor, separate from the central office
18 switching systems, said signaling system security monitor including a
19 plurality of message templates corresponding to approved ones of said
20 control data messages.

1 2. The communications network according to claim 1 wherein said plurality of message
2 templates are associated with a plurality of service providers.

1 3. The communications network according to claim 2 wherein said signaling system
2 security monitor associates each of said control data messages with a corresponding one
3 of said service providers and selects one of said message templates in response to the
4 corresponding one of said service providers.

1 4. The communications network according to claim 1 wherein said signaling system
2 security monitor includes a memory storing sets of templates, each of said sets
3 corresponding to control messages appropriate to particular call progress or transaction
4 flow.

1 5. The communications network according to claim 4 wherein said templates define
2 message formats, parameters and values associated with control message types selected
3 from MTP, SCCP, ISUP, TCAP and AIN type messages.

1 6. The communications network according to claim 4 wherein said signaling system
2 security monitor is configured to select said sets of templates in response to service
3 provider authorization data associated with respective ones of said control data messages.

1 7. The communications network according to claim 1 wherein said signaling system

2 security monitor is configured to selectively communicate said control data messages
3 between said signaling gateway and said signaling communication system in response
4 to said control messages satisfying criteria specified by corresponding ones of said
5 templates.

1 8. The communications network according to claim 1 wherein said signaling system
2 security monitor is configured to selectively enable and inhibit said signaling gateway
3 from exchanging said control data messages between said remote communication
4 network and said signaling communication system.

5 9. The communications network according to claim 1 wherein said signaling system
6 security monitor includes a memory storing states of respective ones of said central office
7 switching systems, said signaling system security monitor responsive to said states for
8 selecting ones of said templates.

1 10. The communications network according to claim 1 wherein said signaling gateway
2 further comprises a signal protocol converter configured to convert SS7 type messages
3 to another packet data format.

1 11. The communications network according to claim 10 wherein the other packet data
2 format is an Internet Protocol (IP) format.

1 12. The communications network according to claim 1 wherein said signaling system
2 security monitor is configured to monitor information contained in an MTP Layer 3
3 portion of said control data messages.

1 13. The communications network according to claim 12 wherein said information
2 contained in said MTP Layer 3 portion of said control data messages includes (i) a
3 destination point code, (ii) an originating point code, and (iii) a service indicator octet.

1 14. The communications network according to claim 12 wherein said signaling system
2 security monitor is configured to monitor at least one of MTP, SCCP, ISUP, TCAP, and
3 AIN messages.

1 15. The communications network according to claim 12 wherein said signaling system
2 security monitor is configured to monitor a plurality of message types selected from
3 MTP, SCCP, ISUP, TCAP, and AIN type messages.

1 16. The communications network according to claim 12 wherein said signaling system
2 security monitor is configured to monitor calling and called party address parameters
3 contained in SCCP message portions of said control data messages.

1 17. The communications network according to claim 16 wherein said signaling system
2 security monitor is configured to determine if said monitored calling and called party

address parameters are consistent with an authorized signaling relationship.

1 18. The communications network according to claim 12 wherein said signaling system
2 security monitor is configured to monitor origination and destination point codes and
3 calling and called party address parameters contained in the header of a TCAP message
4 of said control data messages.

1 19. The communications network according to claim 12 wherein said signaling system
2 security monitor is configured to monitor the originating and destination point code
3 parameters contained in the MTP message portion, as well as the calling and called party
4 address parameters found in the SCCP message portion of said control data messages and
5 determine if a particular originating application is authorized to send a particular TCAP
6 message to a particular destination application.

1 20. The communications network according to claim 1 wherein said signaling system
2 security monitor includes a memory storing a state of said communications network.

1 21. The communication network according to claim 1 wherein said signaling system
2 security monitor includes a memory storing permissible states of said communications
3 network and said templates include data indicating allowable next one(s) of said states.

1 22. The communications network according to claim 1 wherein said signaling system
2 security monitor includes a memory storing data relating call progress status with

3 respective sets of control messages appropriate to initiate a next action consistent with
4 a particular service.

1 23. The communications network according to claim 1 wherein said signaling system
2 security monitor includes a memory storing data relating a transaction state with
3 respective sets of control messages appropriate to initiate a next action consistent with
4 a particular service.

1 24. The communications network according to claim 1 wherein said signaling system
2 security monitor comprises a certification agent configured to exchange and maintain
3 encryption key certificates.

1 26. The communications network according to claim 1 wherein said signaling system
2 security monitor is configured to issue and decrypt digital time stamps.

1 26. A method of securely interfacing control links of respective communication
2 networks, comprising the steps of:

3 storing a plurality of control message templates;

4 exchanging control data messages between a remote communication network and
5 a local signaling communication system;

6 selecting ones of said control message templates in response to respective ones
7 of said control messages;

8 determining, using said templates, if said control data messages are proper;
9 selectively communicating, in response to said determining step, control data
10 messages between central office switching systems;
11 selectively routing messages from an incoming link to an outgoing link in
12 response to said control data messages; and
13 Selectively generating control messages to help restore system integrity in cases
14 where control messages are disallowed.

1 27. The method according to claim 26 wherein said plurality of control message
2 templates are associated with a plurality of service providers.

1 28. The method according to claim 26 further comprising steps of:
2 associating each of said control data messages with a corresponding one of said service
3 providers; and
4 selecting one of said message templates in response to the corresponding one of said
5 service providers.

1 29. The method according to claim 26 wherein each of said templates corresponds to an
2 appropriate one of (i) call progress flow and (ii) transaction processing protocol.

1 30. The method according to claim 26 wherein said templates define message formats,
2 parameters and values associated with control message types selected from MTP, SCCP,
3 ISUP, TCAP and AIN type messages.

1 31. The method according to claim 26 further comprising a step of selecting said sets of
2 templates in response to service provider authorization data associated with respective
3 ones of said control data messages.

1 32. The method according to claim 26 further including a step of selectively enabling
2 and inhibiting a signaling gateway from exchanging said control data messages between
3 said remote communication network and said signaling communication system.